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What is claimed is:

1. An ALD process for deposition of a metal selected from Pd, Rh, Ru, Pt and Ir comprising forming a layer comprising the metal on a surface comprising a material selected from W, Ta, Cu, Ni, Co, Fe, Mn, Cr, V Nb, tungsten nitride, tantalum nitride, titanium nitride, dielectrics and activated dielectrics at a temperature ranging from >60°C to <260°C.

- 2. An ALD process according to claim 1, wherein forming a layer comprises sequentially pulsing into a chamber containing the surface a precursor for the metal and a reducing gas selected from hydrogen, glyoxylic acid, oxalic acid, formaldehyde, 2-propanol, imidazole and plasma-activated hydrogen.
- 3. An ALD process for deposition of a metal selected from Pd, Rh, Ru, Pt and Ir comprising

providing a surface comprising a material selected from noble metals, W, Ta, TaN, tungsten nitride, tantalum nitride, titanium nitride, Cu, Ni, Co, Fe, Mn, Cr, V and Nb in a reaction chamber;

pulsing a precursor for the metal into the chamber at a temperature ranging from >60°C to <260°C; and

pulsing hydrogen gas into the chamber.

- 4. An ALD process according to claim 3 wherein the surface is a noble metal.
- 5. An ALD process according to claim 3 wherein the surface is a pretreated metallic surface selected from W, Ta, tungsten nitride, tantalum nitride, and titanium nitride.
- 6. An ALD process according to claim 3 wherein the surface is a metal selected from Cu, Ni, Co, Fe, Mn, Cr, V and Nb.
- 7. An ALD process for deposition of a metal selected from Pd, Rh, Ru, Pt and Ir comprising

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providing a surface comprising a material selected from noble metals, W, Ta, Cu, Ni, Co, Fe, Mn, Cr, V Nb, tungsten nitride, tantalum nitride, titanium nitride, dielectrics and activated dielectrics in a reaction chamber at a temperature ranging from >60°C to <260°C;

pulsing a precursor for the metal into the chamber; and

pulsing into the chamber a reducing gas selected from glyoxylic acid, oxalic acid, formaldehyde, 2-propanol, and imidazole.

- 8. An ALD process according to claim 7 wherein the reducing gas is glyoxylic acid.
- 9. An ALD process according to claim 7 or 8 wherein the activated dielectric surface comprises at least one of thiol, sulfide, tetrasulfide, phosphine, phosphide or amine groups.
- 10. An ALD process according to claim 7 or 8 wherein the activated dielectric surface comprises thiol groups.
- 11. An ALD process according to claim 7, 8 or 9 wherein the dielectric is selected from CVD polymers, organic-inorganic hybrids, and silicon or metals having an oxide-terminated surface.
- 12. An ALD process for deposition of a metal selected from Pd, Rh, Ru, Pt and Ir comprising

providing a substrate in a reaction chamber;

pulsing a precursor for the metal into the chamber at a temperature ranging from >60°C to <260°C; and

pulsing plasma-activated hydrogen gas into the chamber.

13. An ALD process according to any of the above claims, wherein the precursor is a metal β -diketonate compound.

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14. An ALD process according to any of the above claims, wherein the precursor is a metal-hfac compound.

- 15. An ALD process according to claims 1-12, wherein the precursor is selected from Pd(hfac)₂, Ru(hfac)₂, Rh(hfac)₂, Pt(hfac)₂, Ir(hfac)₂, Ir(acac)₂, Pd(tmhd)₂, Ru(tmhd)₂, Rh(tmhd)₂, and Ir(tmhd)₂.
- 16. An ALD process according to any of the above claims, wherein the metal is Pd.
- 17. An ALD process according to any of the above claims, wherein the precursor is Pd(hfac)₂.